

Cyathea srilankensis Ranil (Cyatheaceae): A New Tree Fern Species From Sri Lanka

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ABSTRACT.—*Cyathea srilankensis* Ranil, a new endemic Sri Lankan tree fern species, is described. It is characterized by large pinnate-pinnatisect leaves, sparse narrowly triangular petiole scales and caducous membranous indusia.

KEY WORDS.—*Cyathea srilankensis*, endemic, tree ferns, Sri Lanka

The tree fern family Cyatheaceae consists of about 700 species worldwide with diversity centers in tropical wet mountain regions (Tryon and Gastony, 1975; Conant *et al.*, 1996). The family Cyatheaceae is one of the most interesting families among the ferns, due to its wide geographical distribution combined with pronounced local endemism (Tryon and Gastony, 1975). In Sri Lanka, the family is represented by a single genus, *Cyathea* Sm., which includes five species, one variety and one suspected hybrid (Holttum, 1965a; Sledge, 1982; Ranil *et al.*, 2004; and Philcox, 2006). During recent fieldwork in the Sinharaja forest reserve four mature individuals of *Cyathea srilankensis* Ranil were observed together with a small population of immature plants. All individuals were clustered in a single locality. Specimens collected from four mature and four juvenile plants were used to describe the species.

***Cyathea srilankensis* Ranil, sp. nov.** TYPE.—Sri Lanka. Sinharaja forest: Prov. Sabaragamuwa, Ratnapura District, 06°41'664"N, 80° 42'380"E, 542 m elevation, 15 May 2007, R.H.G. Ranil 50R (holotype: PDA, 5 sheets). **Fig. 1 A–H** and **Fig. 2 A–E**.

Filix arborescens. Truncus usque ad 210 cm. altus, usque ad 5 cm. crassus, basibus petiolorum emortuorum vestitus. Petiolus 18–28 cm. longus, prope basim 0.8–1.0 cm crassus. Paleae petioli 0.8–1.2 cm. longae, 0.1–0.15 cm. latae, anguste triangulares, atrocastaneae, apice spina prominente sordide brunnea provisae. Lamina pinnato-pinnatisecta, 130–202 cm. longa, 40–65 cm. lata. Pinnae 15–30 cm. longae, 2–3 cm. latae, 44–57 iugatae. Pinnulae 1.5–2 × 0.5 cm.,

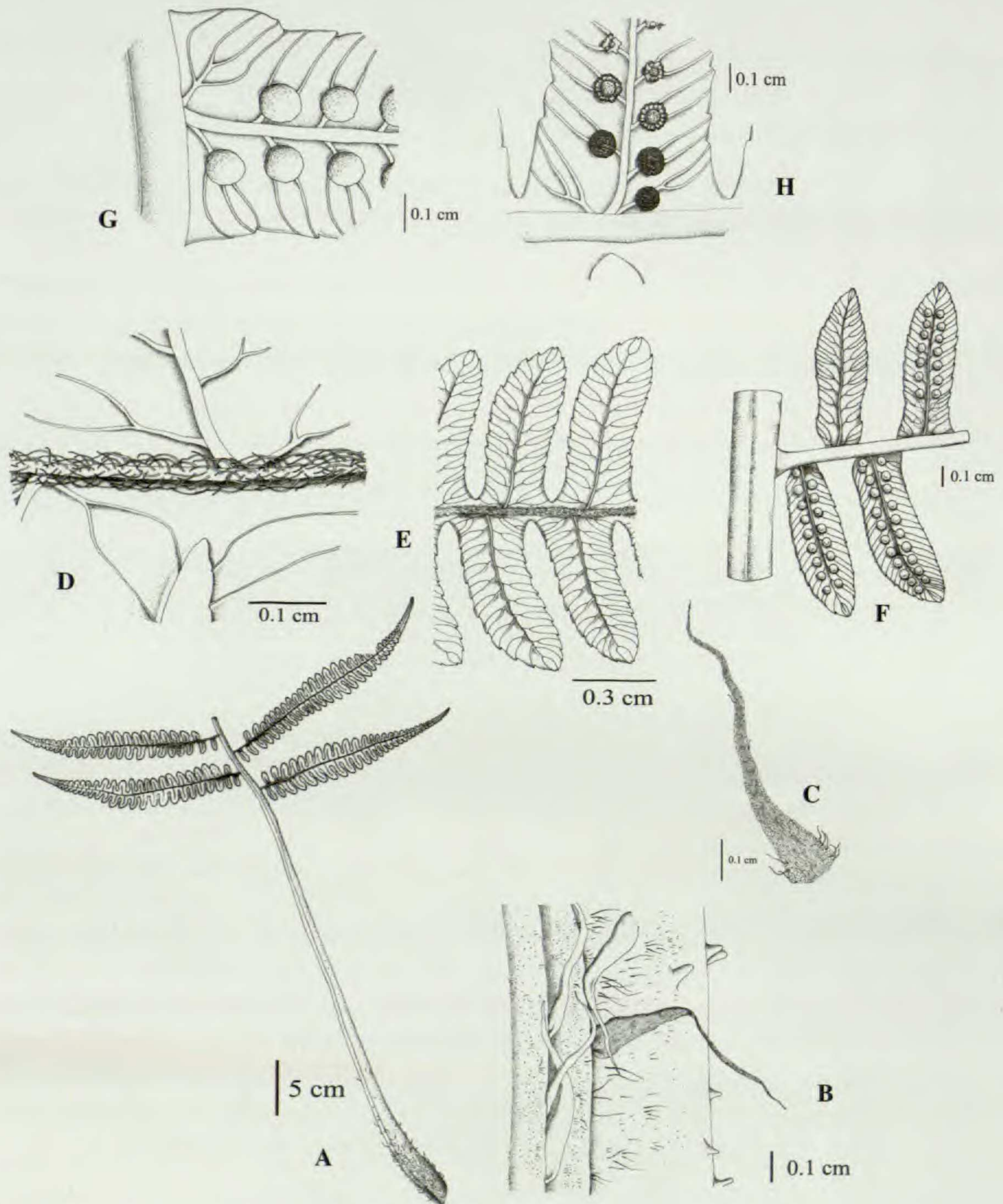


FIG. 1. *Cyathea srilankensis* Ranil. A. Petiole with scales and pinnae, B. A part of the petiole with scales and spines (adaxial face), C. Petiole scale, D. Adaxial face of the costa with dense hairs, E. Part of a pinna with broadly adnate pinnules (adaxial face), F. and G. Pinnules with immature sori, H. Pinnule with different maturity stages of sori.

ad costam adnatae (iuga infima sessilia) et pinnulae contiguae confluentes. Sori indusiis membranaceis, hyalinis, in statu juvenili globose, sed cito emarcidis, in soriis maturis solum rudimenta exhibentibus (collum basi receptaculi).

Trunk erect, unbranched, up to 210 cm in height, 5 cm in diameter, entirely covered by persistent dead petiole bases, leaf scars not visible, usually with

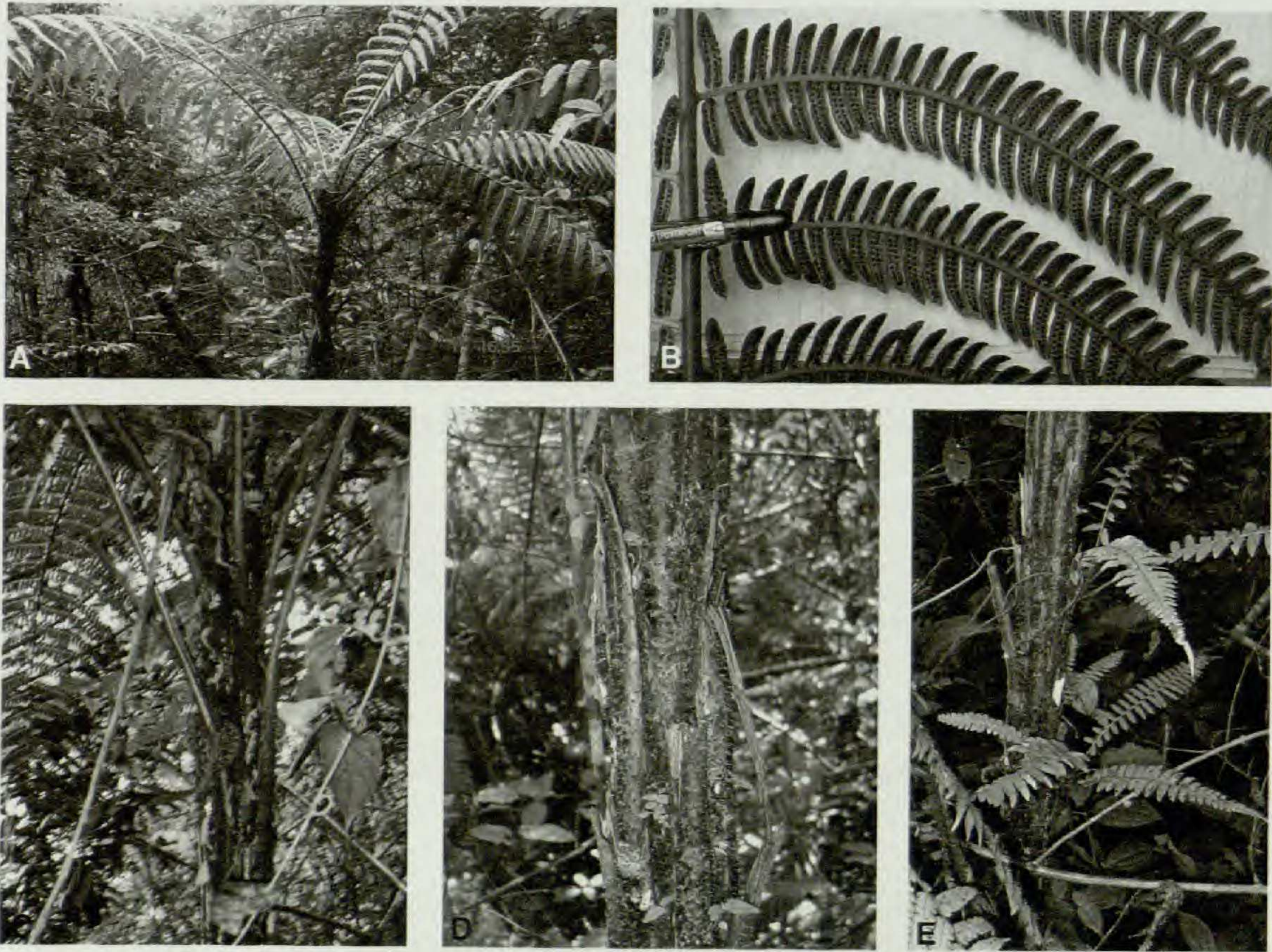


FIG. 2. *Cyathea srilankensis* Ranil. A. Umbrella shaped crown; B. Lower surface of the leaf with sori; C. Trunk apex with petiole base; D. Trunk surface covered by persistent leaf bases; E. Trunk with adventitious shoots.

few adventitious shoots. Crown of 4–8 large leaves crowded at the apex of the stem. Petiole dark brown to dark chestnut coloured, shiny, 18–28 cm long, 0.8–1.0 cm in diameter at its base, with blunt, 0.1–0.2 cm long spines, dense at the petiole base. Petiole scales 0.8–1.2 cm long, 0.1–0.15 cm wide at their base, coriaceous, linear to narrowly triangular, with an apical spine, margin sometimes with several conspicuous dark setae, scales densely covering the younger leaves. Lamina large, 130–202 × 40–65 cm, pinnate-pinnatisect, elliptic to lanceolate, dark green adaxially, pale green abaxially, with a pinnatifid apex, subcoriaceous to coriaceous, rachis dark brown and shiny, glabrous adaxially, few lower pinnae at the base, abruptly narrowed and more sparsely placed. Pinnae 15–30 × 2–3 cm, 44–57 pairs, the lowest pinnae 15–20 cm long, the middle pinnae 15–30 cm long, sessile or shortly petiolulate (petiolule 0.2–0.3 cm long), alternate, linear, their apex pinnatifid, serrate, acuminate, middle pinnae 4–5 cm apart. Costa densely hairy adaxially, dark brown, glabrous. Pinnules 1.5–2 × 0.5 cm, 30–40 pairs, 0.2 cm apart, basal pinnule pair free, others broadly adnate to the costa and adjacent pinnules confluent from the lower quarter of the pinna, alternate, oblong and falcate, with an obtuse to acute apex, margin serrate. Veins once or twice forked, the proximal pair three or four times forked, 8–10 pairs in each pinnule, free, reaching the margin. Sori round, about 0.1 cm in diameter, 8–10 pairs in each

pinnule in two parallel rows on either side of the costula, inserted close to the costula at the fork of the veins, indusiate. Indusia globular, light brown, very thin, membranous, gradually degraded, at maturity only a reduced uneven disc around the base of receptacle persists. Spores trilete.

DISTRIBUTION.—Endemic to Sri Lanka and most likely limited to the Sinharaja forest reserve at Ratnapura district in Sabaragamuwa Province.

ECOLOGY.—All plants were recorded from roadside banks and open areas in Sinharaja forest associated with sun loving plants, such as *Clidemia hirta* (L.) D. Don, *Melastoma malabathricum* L., *Hedyotis* spp., *Blechnum orientale* L. and *Dicranopteris linearis* L.

ADDITIONAL SPECIMENS EXAMINED.—Sri Lanka. Prov. Sabaragamuwa, Sinharaja forest reserve, 542 m, 19 July 2007, R.H.G. Ranil, 78R (2 sheets), 79R (4 sheets), 80R (4 sheets) (PDA); 536 m, 04 July 2008, R.H.G. Ranil, 120R (3 sheets), 121R (5 sheets), 122R (3 sheets) (PDA); 540 m, 11 December 2008, R.H.G. Ranil, 320R (3 sheets) (PDA).

DISCUSSION.—In Sri Lanka, *Cyathea srilankensis* remotely resembles *C. hookeri* Thw. from which it is easily distinguished by its larger trunk and leaves as well as by its pinnate to pinnatisect pinnae. *Cyathea srilankensis* cannot be confused with any other tree fern species known from Sri Lanka. From comparisons of morphological characters with known species of the family Cyatheaceae described in Holttum (1963, 1964, 1965a, 1965b, 1974, 1981), Conant (1983), Holttum and Edwards (1983), Large and Braggins (2004), Edwards (2005), Janssen and Rakotondrainibe (2006, 2007, 2008), it was clear that *C. srilankensis* is somewhat morphologically similar only to *C. humilis* Hieron., which occurs in 1,100–2,000 m altitude montane forests of Tanzania and Kenya, and to *C. schliebenii* Reimers occurring in 1,800–2,000 m altitude montane forests in Tanzania. However, *C. srilankensis* can be differentiated from both *C. humilis* and *C. schliebenii* by its longer petioles with sparsely arranged scales, abruptly narrowed leaf base with more sparsely placed and few lower pinnae, absence of hairs from the adaxial face of the rachis and from the abaxial face of the costae (Table 1). This was further confirmed by comparing digital images of type specimens of both *C. humilis* and *C. schliebenii* and specimens available at the Paris herbarium with *C. srilankensis*. According to Holttum (1981) and Edwards (2005), *C. humilis* var. *pyconophylla* differs from *C. srilankensis* by its lamina being 115 cm long, its pinnae being inserted at right angles to rachis, the basal ones 1–1.5 cm long, its largest pinnae being 17 cm long and 2.5 cm wide, its middle pinnae being 2.5 cm apart, and its pinnules being separated by narrow sinuses. No similar species have been reported from southern India, southeast Asia or Australia (Large and Braggins, 2004).

Holttum (1981) has suggested an affinity of Sri Lankan *Cyathea* species with African elements. Such a disjunct pattern might result from an ancestral species that was widespread across the ancient continent of Gondwana (Strahler and Strahler, 2005). It has been shown previously, that Sri Lankan

TABLE 1. Comparison of *Cyathea schliebenii*, *Cyathea humilis* and *Cyathea srilankensis*.

Major characters	<i>C. schliebenii</i>	<i>C. humilis</i>	<i>C. srilankensis</i>
Habitat elevation (m)	1,800–2,000	1,100–2,000	410–665
Trunk height (m)	up to 5	up to 2.5	up to 2.1
Trunk diameter (cm)	up to 3.5	up to 4	up to 5
Petiole length (cm)	10–20	2–10	18–38
Petiole scale arrangement	Dense	Dense	Sparse
Petiole scale size (cm)	1–1.2 × 0.1–0.15	1–1.5 × 0.1–0.5	1–1.2 × 0.1–0.15
Length of lamina (cm)	70–85	40–180	130–202
Width of lamina (cm)	24–30	24–34	40–65
Lower pinnae	Gradually decrescent, pinnae close to each other	Gradually decrescent, pinnae close to each other	Abruptly narrowed, pinnae distant from each other
No. of pinna pairs	20–40	40–50	44–57
Length of lowest pinnae (cm)	4–7	1.5–3	5–7
Length of largest pinnae (cm)	12–15	12–17	20–32
Hairs on rachis (adaxial face)	Present	Present	Absent
Hairs on costa (abaxil face)	Present	Present	Absent
Pinnule margins	Slightly crenate to subentire	Entire, crenate near the apex	Serrate
Veins	Forked, 10–11 pairs per pinnule	Forked, 7–9 pairs per pinnule	Forked, 8–10 pairs per pinnule

tree ferns form a monophyletic group not closely related to African tree ferns (Janssen *et al.*, 2008). However, the phylogenetic position of *C. srilankensis* remains to be elucidated.

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